AMENDMENTS TO THE CLAIMS

1-4. (Canceled)

5. (Currently Amended) A multiplexing QAM demodulation apparatus <u>adapted to demodulate</u> <s>which demodulates</s> a reception signal of a multiplexed QAM-modulated wave transmitted from a multiplexing QAM apparatus and <u>determine</u> <s>determines</s> a plurality of differential-gain-multiplexed input data, comprising:

      a probability calculating unit <u>adapted to calculate</u> <s>that calculates</s> probabilities <u>of the</u> <s>that</s> <s>said</s> reception signal <u>corresponding</u> <s>corresponds</s> to respective symbol positions<s>,</s> based on variance of symbol positions caused by a transmission line; <s>and</s>

      <u>an expectation value calculating unit adapted to calculate an expectation value of each of the plurality of differential-gain-multiplexed input data based on the calculated probabilities;</u>

      a demodulation unit <u>adapted to estimate</u> <s>that calculates an expectation value of each of said plurality of differential-gain-multiplexed input data, based on said probabilities that said reception signal corresponds to said respective symbol positions, and estimates said</s> <u>a</u> multiplexed input data based on <u>an</u> <s>said</s> expectation value of said <u>multiplexed</u> input data<u>; and</u>

      <u>wherein said demodulation unit is adapted to first estimate said multiplexed input data having been given a larger modulated wave gain in multiplexing and then estimate remaining input data while eliminating improbable symbol positions from the estimated multiplexed input data.</u>

6. (Canceled)

7. (Currently Amended) A multiplexing QAM demodulation apparatus <u>adapted to demodulate</u> <s>which demodulates</s> a reception signal of a multiplexed QAM-modulated wave transmitted from a multiplexing QAM apparatus and <u>determine</u> <s>determines</s> a plurality of differential-gain-multiplexed input data, comprising:

      a judgment unit <u>adapted to estimate</u> <s>that estimates</s> individual symbol positions which appear in <u>a</u> <s>the</s> received multiplexed QAM-modulated wave based on both a symbol position arrangement of said multiplexed QAM-modulated wave and a characteristic of a transmission line<u>;</u><s>,</s>

      <u>wherein the judgment unit is adapted to determine</u> <s>determines</s> a most probable symbol position based on distances between the estimated individual symbol positions and a symbol position of said reception signal<u>;</u><s>, and then</s>

      <u>wherein the judgment unit is adapted to determine a</u> <s>determines said</s> plurality of input data from the determined <u>most probable</u> symbol position<u>; and</u>

      <u>a demodulation unit adapted to first estimate said multiplexed input data having been given a larger modulated wave gain in multiplexing and then estimate remaining input data while eliminating improbable symbol positions from the estimated multiplexed input data.</u>

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8. (Currently Amended) ~~A~~ The multiplexing QAM demodulation apparatus <u>according to claim 7, wherein the apparatus</u> ~~which demodulates a reception signal of a multiplexed QAM-modulated wave transmitted from a multiplexing QAM apparatus and determines a plurality of differential-gain-multiplexed input data,~~ <u>further</u> comprising:

a training unit that receives a prescribed training signal transmitted from said ~~multiplexing QAM~~ apparatus during an initialization period of signal transmission~~;, and~~<u>;</u>

<u>wherein the training unit is adapted to determine</u> ~~determines~~, based on said training signal<u>, and</u> by operating with said ~~multiplexing QAM~~ apparatus, at least one parameter among:

a QAM value of respective QAM-modulated waves to be differential-gain-multiplexed into said multiplexed QAM-modulated wave;

a gain difference between said QAM-modulated waves; and

a phase difference between said QAM-modulated waves, so that a proper inter-symbol distance of said multiplexed QAM-modulated wave can be secured after the reception.

9. (Canceled)

10. (New) The multiplexing QAM demodulation apparatus according to claim 5, wherein the apparatus further comprising:

a training unit that receives a prescribed training signal transmitted from said apparatus during an initialization period of signal transmission;

wherein the training unit is adapted to determine, based on said training signal and by operating with said apparatus, at least one parameter among:

a QAM value of respective QAM-modulated waves to be differential-gain-multiplexed into said multiplexed QAM-modulated wave;

a gain difference between said QAM-modulated waves; and

a phase difference between said QAM-modulated waves, so that a proper inter-symbol distance of said multiplexed QAM-modulated wave can be secured after the reception.

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